

NOTES ON MIGRATIONS OF THE PAINTED LADY
BUTTERFLY IN 1945BY JOHN W. SUGDEN*, ANGUS M. WOODBURY AND CLYDE GILLETTE
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After an absence of four years, emigrational flights of the Painted Lady Butterfly, *Vanessa cardui* (L), again appeared in Utah. Previous such dispersal flights were reported in 1924, 1930, 1931 and 1935 by Sugden (Pan-Pac. Ent., 13:109-110) and in 1941 by Woodbury, Sugden and Gillette (Pan-Pac. Ent., 18:165-176). Available information was summarized by Williams (Ann. Ent. Soc. Amer., 31:219-223).

The reappearance in Utah was heralded by a similar movement along the Pacific coast. On March 28, 1945, C. H. Abbott, University of Redlands, reported to Woodbury that a migration of the butterflies had been in progress in California since March 12th. He states, "The migration is west to Hermosa Beach and north to the middle of the Mohave Desert, in both instances beyond the extent of the 1941 migration." If the 1945 movement in California was more extensive than in 1941, it was in contrast with the movement in Utah where it was only a fraction of the previous one.

The principal flight at Salt Lake City and vicinity occurred on April 22, 1945, although vanguards probably arrived two or three days earlier. Gillette noted two butterflies on April 19 and 20, but saw no flight in force until April 22. Ellis R. Wilson informed C. W. Lockerbie that the largest concentration of butterflies occurred on his farm near Centerville in Davis County, north of Salt Lake City, on April 21 and 22, when he noted butterflies concentrated around his apricot trees which were in bloom, an average of about 10 butterflies per tree.

Several observers noted them in Salt Lake City on April 22. Gillette noted on that date that on a north-south line, thirty paces long, repeated counts gave an average of 23 butterflies per minute passing the site. They were flying approximately northeast and varied from a few degrees east of north to a few degrees south of east. Those flying south or west would usually change the direction after a short time to the general north-east direc-

* Deceased.

tion. The butterflies were flying fast, singly as a rule but occasionally up to five in a group, and some would stop in the open fields or alight on the moist ground. The flight lasted all afternoon and diminished as evening approached. After April 23, he observed, the flight in Salt Lake City seemed to have dispersed.

On April 22, Ashby D. Boyle reported that there was a flight in the northern part of the city and that the butterflies were crossing Eighth Avenue, an east-west street, in a northern flight. David P. Sugden reported that they were numerous in the western part of the city and that they were coming from the south.

Sugden found many in his garden, on April 22, alighting on the moist, exposed ground and on some of the plants, feeding, taking water or resting in the sun's rays especially on the sunny side of the garden house. The flight in the garden was erratic, without definite flight pattern but usually the butterflies went over the north fence when they left.

Sugden and Woodbury made observations over the eastern part of the city, then along a route south on State Street to Murray, east along 56th South to Holliday and back to Salt Lake bordering the foothills. From 5 to 10 were seen per block while travelling in a car over most of the route. The flight was not as direct as with previous flights and was generally toward the north and the northeast. In Murray and east of Holliday the majority that were flying steadily were going toward the east or slightly southeast but others were flying in other directions and many were fluttering about or feeding.

In the early morning of the next day, Woodbury found butterflies resting among the shrubbery in a gulley on the University of Utah campus. A few were resting on foliage, some were on flowers but others were selecting spots on the ground where the sun was shining directly upon it between the vegetation. Such spots appeared to be slightly warmer than surrounding areas and the butterflies alighting in such spots usually spread out the wings so that the outside was close to the ground and the inside was exposed to the direct rays of the sun. This seemed to be a "warming-up" process. They left during the day.

On April 22, C. W. Lockerbie observed the butterflies on the road from about 3 miles west of Brigham City to the Bear River Marshes, 20 miles west of the city. He counted from 5 to 10 per mile, flying against a strong north wind. This is the most north-

erly record available and the only one in Boxelder County. It is not to be supposed that the flight stopped here, however. It probably continued on at least into southern Idaho.

During the following weeks, butterflies were observed in several other places in Utah, as well as occasional scattered individuals from Salt Lake City. In response to a request for data by Woodbury in the newspapers, the butterflies were reported during the week of April 25 at the Japanese Relocation Camp at Topaz, Millard County. M. J. Madsen (in letter) stated that on April 28 the butterflies were noted, flying in a northerly direction all the way from Nephi to St. George. The next day on the return trip, they were noted near Richfield in Sevier County and northward.

On April 29, Lockerbie observed the butterflies at Payson, Utah County, and vicinity. Just before sun up, he flushed two or three from sage and rabbit brush about every ten or fifteen feet. They seemed to be resting overnight on the brush near the ground. On the old Payson-Spanish Fork road through open greesewood and salt grass country, forty-one were counted in a mile and most were feeding where dandelions were plentiful or flying north with the wind. At Lincoln Beach, Utah County, as many as ten per area of twenty square feet were feeding on a small yellowish white bloom. He also found them common in the bottoms of Spanish Fork Canyon and observed them from Jordan to Riverton, Salt Lake County, in groups up to five fluttering about each other.

Madsen noted them again, on May 5, along U. S. Highway 40 from the vicinity of Strawberry east to Vernal where they were crossing the highway flying north. Gillette noted the butterflies at several places in Zion National Park, from May 29 to June 3. These insects were definitely not in migrational flight, had torn and battered wings, had a weak flight and would fly only short distances. They were probably resting after a flight.

DISCUSSION

The flight of the Painted Lady Butterfly in Utah in 1945 was much less extensive than that of 1941. The extreme dates of observation of the butterflies extended from April 19 to June 3, 1945, but the numbers observed and reported were very meager compared with the flight four years earlier.

The main flight which seems to have reached Salt Lake City on April 22, probably represented the greatest intensity of the movement in Utah but minor flights which were not observed at Salt Lake City seem to have occurred through western Utah within the next week or two thereafter.

It seems probable that weather conditions affect the timing of flights. The next few days following April 22 were stormy and rainy in the Salt Lake Valley and the intensity of the flight rapidly diminished following the initial outburst. A drop in temperature accompanied by precipitation has been noted to nearly stop the movement.

Comparing the flights reported in past years at Salt Lake City, it appears that the height of the movement has varied in time about 6 weeks, from March 30 to May 8, as follows: April 13, 1924; March 30, 1930; May 3, 1931; May 7-8, 1935; May 8, 1941, and April 22, 1945.

During the migrations, the butterflies tend to feed upon almost any flower that is in bloom. At the time they appeared in Salt Lake City, about April 22, the first bloom of the dandelion was in progress and the flowers were available to the butterflies in roadsides, lawns and widespread extensive fields. Some orchards were also in bloom, especially apricots and cherries. As the season progressed, there was a change in bloom with the unfolding of new blossoms and withering of old ones, but they seem to have been sufficient to sustain, at least part of the migrant populations. The part that low food supply might play in decimation of the flying hordes has not been ascertained.

In 1941, it was noted that the migrants left a new generation to grow on all the thistles observed in many places in the Salt Lake region. When the first migrants appeared in 1945, none of the thistles were beyond the early rosette stage; some were just putting out the first leaves and none had begun the stalk. Apparently the thistles were not far enough advanced for oviposition and although Sugden examined many of the areas that had borne large numbers of caterpillars on the thistles in 1941, none were found at any time in 1945 although flights had passed over the areas.

The explanation appears to lie in the fact that the caterpillars in past years had been borne on the leaves of the stalk and not on the rosette, the leaves of which wither and die after the stalk

becomes established. Feeding of the larvae on the rosette at that early stage of development might hinder or prevent proper establishment of the stalk and result in failure to develop enough food for the larvae.

Report of the writers (*op. cit.*, p. 174) on the 1941 flights indicated a characteristic pattern of movement during migration, in which the butterflies became more active during the warm parts of warm days and slowed down and stopped at night and on some cold days. Additional information is now available concerning the resting at night and on cold days. All three of the writers as well as Lockerbie observed them independently where they had been resting overnight. In addition, A. D. Boyle (field notes) "flushed" the butterflies all the day of April 21, 1935, near Vernon, Benmore and Lookout Pass in Tooele County. There was "no sun, a fairly stiff, cold wind and Painted Ladies were flushed all day, even when it was sprinkling slightly. J. L. Mullen reports much the same experience west of Utah Lake and at Alpine," Utah County.

The additional information accumulated from the 1945 migration tends to confirm the idea that these emigrations result from overcrowded areas of southern United States or Mexico; that they afford a means by which the surplus population may relieve congestion by dispersal flights; and in some cases provide a means of developing additional generations. The new generations, however, probably do not survive the severe winters of this area and since eggs are not laid until spring, there are no adults left to propagate and hence disappear. They persist farther south where adults can survive the winters.

REVIEW: CHECK LIST OF THE CICADELLIDAE

Check List of the Cicadellidae (Homoptera) of America, North of Mexico, by Dwight M. De Long and Dorothy J. Knull. Graduate School Studies. Biological Science Series No. 1. The Ohio State University Press, Columbus, Ohio. Pages V + 102. 1946. \$1.50.

In 1937 De Long and Caldwell published a check list of the North American Cicadellidae which contained 145 genera and